



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------------|------------------|
| 09/891,682 | 06/26/2001 | Evan George Colgan | YOR9-2001-0004 US1 (8728- | 9748 |
| 7590 03/11/2004 F. CHAU & ASSOCIATES, LLP Suite 501 1900 Hempstead Turnpike East Meadow, NY 11554 | | | EXAMINER QI, ZHI QIANG | |
| | | | ART UNIT 2871 | PAPER NUMBER |

DATE MAILED: 03/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|-----------|
| Office Action Summary | Application No. 09/891,682 | Applicant(s) COLGAN ET AL. | |
| | Examiner Mike Qi | Art Unit 2871 | <i>fw</i> |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8 is/are rejected.
- 7) ☒ Claim(s) 6, 7 and 22 is/are objected to.
- 8) ☒ Claim(s) 9-14 and 16-21 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of US 5,766,493 (Shin) and JP 9-230317 (Katsuhiko et al).

Claim 1, AAPA discloses (page 1, line 14 – page 9, line 5; Fig.1) that a method of fabricating a collimate and post diffuse type liquid crystal cell comprising:

- first substrate (TFT substrate) (9), second substrate (color filter substrate) (7), having same thickness, such as 0.7 mm;
- lapping the first substrate and concurrently lapping the second substrate;
- polishing the first and second substrates.

AAPA also disclosed (page 2, lines 18 –24) that the bulk of the material is removed by lapping using rough abrasive compounds. Therefore, the material would be removed more in a faster lapping rate, and the material would be removed less in a slower lapping rate.

AAPA does not expressly disclose making the first substrate and the second substrate having different thickness by lapping the first substrate at a first rate and lapping the second substrate at a second rate, and the thinner substrate is on the viewer side of the liquid crystal cell.

However, Shin discloses (col.3, lines 30 – 41) that the upper and lower substrates can have different thickness. The thinner substrate would have good light transmittance, the thicker substrate would prevent cracks. Therefore, using thinner substrate on the viewer side of the liquid crystal cell would increase the light transmittance, and increasing the display brightness; and using thicker substrate on the support side of the liquid crystal cell would prevent the cracks during assembly process. Inherently, the thinner substrate must be on the viewer side of the liquid crystal cell as to increase the light transmittance.

Although AAPA and Shin do not expressly disclose that providing the thinner of the first and second substrates on a viewer side of the collimate and post diffuse type liquid crystal cell to reduce depixelization, but in order to increase the transmittance, to provide thinner substrate on the viewer side of the liquid crystal cell that is an inherent property and obviousness.

However, Katsuhiko (JP 9-230317) discloses (abstract; Fig.1) that forming the transparent substrate on an observation side (viewer side) is thinner than the transparent substrate on a back surface side so as to improve resolution, to increase brightness and to make screen display with improved image quality.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a first lapping rate for lapping the first substrate

Art Unit: 2871

thinner and to use a second lapping rate for lapping the second substrate thicker so as to have different thickness for the first and the second substrates as claimed in claim 1, since the thinner substrate would increase the display brightness and the thick support substrate would prevent cracks during the assembly process, and providing the thinner substrate on the viewer side so as to increase the image clarity and brightness efficiency and to improve the resolution.

3. Claims 2-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA), US 5,766,493 (Shin) and JP 9-230317 (Katsuhiko et al) as applied to claim 1 above, and further in view of "Development of a Manufacturing Process for a Thin, Lightweight LCD Cell" (Ohkuma et al).

Claims 2-4, Shin discloses (col.3, lines 30 – 41) that the upper and lower substrates can have different thickness. The thinner substrate would have good light transmittance, the thicker substrate would prevent cracks.

Still lacking is the limitation such that thinning by lapping and polishing, and using an abrasive material.

However, Ohkuma discloses (Fig.2) that the LCD cell thinning by lapping and polishing, and using an abrasive material on a plate and rotating the plate to lap the substrates. The faster lapping rate would remove more material than the slower lapping rate.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use greater lapping rate for lapping the color filter

Art Unit: 2871

substrate and to use slower lapping rate for lapping the TFT substrate, in order to make a thinner color filter substrate and a thicker TFT substrate as claimed in claims 2-4, since the thinner substrate would increase the display brightness and thicker substrate would prevent the cracks, especially the TFT substrate has more electrical connections need to be protected and reducing the breakage occurrence.

Claim 5, AAPA discloses (page 2, lines 8-25) that using 0.7 mm thick array glass substrate and 0.7 mm thick color filter substrate, i.e., the same thickness of 0.7 mm.

Claim 8, AAPA discloses (page 2, lines 8-25) that polishing is used to make both sides of the cell smooth, and generally, making equal thinning for both the array glass and the color filter glass, therefore, the polishing must be performed at a same polishing rate in order to obtain the equal thinning.

Allowable Subject Matter

4. Claims 6-7 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. Claims 9-14,16 and 17-21 are allowed.

6. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither discloses nor teaches a method for

Art Unit: 2871

fabricating a collimate and post diffuse type liquid crystal cell comprising various steps and a collimate and post diffuse type liquid crystal cell comprising various elements as claimed, more specifically, as the following:

the different thickness for the color filter substrate and the TFT array substrate are 0.4 mm and 0.6 mm respectively [claim 6];

the step of providing the thinner of the first and second substrates includes the step of providing a depixelization ratio of less than about 2.0; and further the depixelization ratio of less than about 1.6 [claims 7 and 22];

the step of providing the thinner of the first and second substrates on a viewer side of the collimate and post diffuse type liquid crystal cell to reduce depixelization and to provide depixelization ratio of less than about 1.6 [claim 9];

the thickness of the color filter substrate is less than the thickness of the TFT array substrate to provide a depixelization ratio of less than about 1.6 [claim 17];

The color filter substrate including a thickness which is less than a thickness of the thin film transistor array substrate to provide a depixelization ratio less than about 2.0 [claim 21].

The closest references AAPA, Shin and Ohkuma disclose a collimate and post diffuse type liquid crystal cell wherein the upper and lower substrates having different thickness and using lapping and polishing to make the substrate thinning, but the prior art of records do not disclose the color filter substrate has 0.4 mm thickness and the TFT array substrate has 0.6 mm thickness as claimed in claims 6; and most references indicate thinning the thickness less than 0.5 mm

Art Unit: 2871

would be very difficult, because more thin substrate would be very easy to be broken and get cracks. The prior art of records also do not disclose the thinner color filter substrate and the thicker TFT array substrate would provide a depixelization ratio of less than about 2.0 and 1.6 as claimed in claims 7,22,9,17 and 21.

Response to Arguments

7. Applicant's arguments with respect to claims 1-14,16-22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

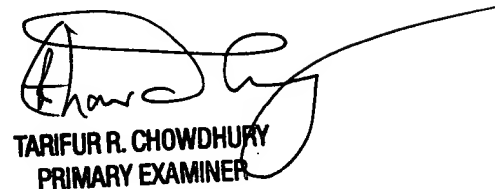
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2871

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
February 24, 2004



TARIFUR R. CHOWDHURY
PRIMARY EXAMINER